

# Motion at constant acceleration

- Acceleration:

$$a = \frac{\text{change in velocity}}{\text{change in time}} = \frac{\Delta v}{\Delta t}$$

- If there were no air resistance, all objects in Earth gravity would fall with the same acceleration,  $g=9.8 \text{ m/s}^2$

- For motion at constant acceleration  $a$ , with no initial speed, the displacement after time  $t$  is:

$$Dx = v_{\text{average}} t = \left( \frac{0 + at}{2} \right) \times t = \frac{at^2}{2}$$

# Homework

## Problem 1.

Suppose that you are trying to reproduce an experiment of Galileo by dropping a rock from certain tower. The time of its free fall turns out to be  $t=5.0$  seconds.

a) How tall is the tower?

b) What will be the time of the rock's fall if it is dropped from half the tower's height?

## Problem 2.

The largest passenger airplane, Airbus A380, has the take off speed  $v= 280$  km/hr. It reaches that speed by moving at acceleration  $a=2$  m/s<sup>2</sup>, starting from rest. How long the runway should be?